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<p>(71) Applicant Rasta Abrasives UK Limited (United Kingdom), Rasta House, Kirk Sandall Industrial Estate, Doncaster DN3 1QR</p> <p>(72) Inventor Paul Welburn</p> <p>(74) Agent and/or Address for Service Keith W. Nash & Co., Pearl Assurance House, 90-92 Regent Street, Cambridge CB2 1DP</p>	<p>(56) Documents cited GB 1222831 GB 0426889 GB 0584063 GB 0395288</p> <p>(58) Field of search E1B E1D E1W</p>

(54) **Non-slip floor**

(57) Non-slip characteristics are imparted to a new or existing floor or ground surface by filling an array of depressions in the surface with material which hardens to give, or to support, a non-slip surface, e.g. a synthetic plastics material, to which a coating of silica sand is applied.

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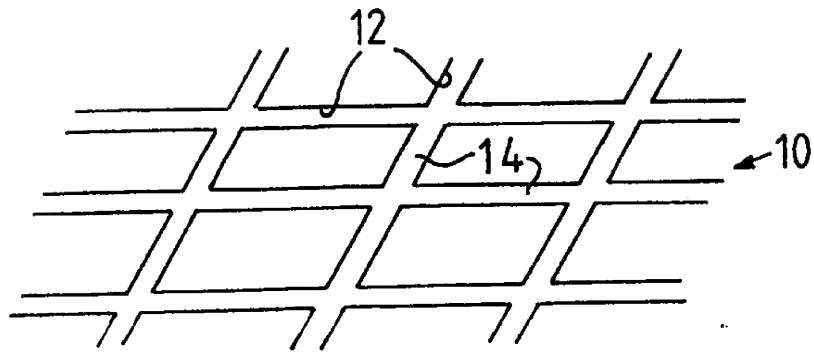


Fig. 1

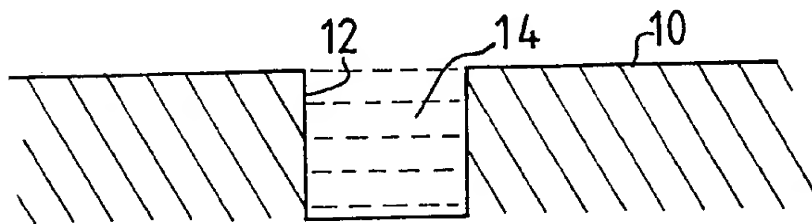


Fig. 2

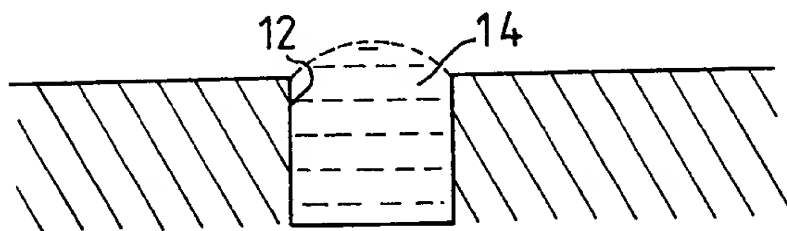
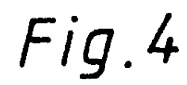


Fig. 3

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SPECIFICATION

Non-slip surfaces

5 *Field of the invention*

This invention relates to non-slip floor or ground surfaces and to the treatment of floor or ground surfaces to render them non-slip.

10 *Background to the invention*

It is known to impart non-slip characteristics to an existing floor or ground surface by roughening or scabbling the surface, by cutting or hammering grooves and/or indentations into the surface, for example to give cobblestone, parallel, roughened, textured, bush hammered or grooved pattern or to expose the aggregate. Such surfaces are difficult to maintain and keep clean and, moreover, the presence of the grooves or the breaking up of the surface tends to weaken the structure.

It is also known to roughen the whole surface area (eg of a floor) and to cover it with a non-slip or anti-skid paint or resin. This process is very costly because the entire surface needs roughening and because non-slip substances to cover the entire area are costly.

The invention aims to provide a new way of treating new or existing floor or ground surfaces to render them non-slip, and also to such surfaces having non-slip characteristics imparted thereto.

Summary of the invention

According to one aspect of the invention a floor or ground surface has non-slip characteristics imparted thereto by a material, or a surface coating thereon, which has been allowed to harden in a regular or irregular array of depressions in the surface.

The term "non-slip" is used to mean less slippery than the surrounding surface material.

The non-slip material should be flush with the surrounding surface or should protrude slightly thereabove to be effective in imparting non-slip characteristics.

By applying the material selectively to the surface, only in the region of the depressions, non-slip characteristics can effectively be imparted to the entire surface in an economical way.

The array of depressions may represent a comparatively small proportion of the area of the treated surface, and may be in the form of an array of relatively narrow lines, eg 6mm wide, or relatively small circles or other shapes.

The spacing between the depressions may be selected depending on the nature of the surface and its intended use. The depressions are preferably sufficiently closely spaced so that there will be at least one region of non slip material beneath the area of the foot of a typical intended user. Thus, for instance, on surfaces for use primarily by adult humans, the depressions may be spaced apart by as much as say 250mm while still providing an effective non-slip surface. On surfaces for use by animals, eg cows, the depressions should of course be rather more closely spaced to achieve the same

effect.

The depressions may be cut, drilled, machined or hammered in the surface. Alternatively they may be formed when a surface is being newly produced.

Typical surfaces which can benefit from treatment include domestic, commercial, agricultural and industrial floors, eg loading ramps, walkways, farmyards, wooden floors, tiled floors or steel decks.

Preferably, the material in the depressions is a synthetic plastics material or a rubber based material, examples being a slurry seal, epoxy resin, rubber (natural or synthetic), synthetic polymer, or a polyurethane, polyethylene, polypropylene or acrylic or nylon based material or silica based material. If desired, the material may contain or be coated with a non-slip coating aggregate or finish, such as silica sand or any other non slip agent.

The depressions may be in the form of grooves or indentations which may be cut, hammered, drilled or machined to a depth, width and pattern to suit the particular location. For example, the grooves can be cut in parallel lines, chosen spacing, or could be a matrix of lines forming a mesh pattern, similar to a cobblestone effect.

According to another aspect of the invention there is provided a method of imparting non-slip characteristics to a floor or ground surface, comprising filling a regular or irregular array of depressions in the surface with a material which hardens to give, or to support, a non-slip surface.

For example, the grouting of a tiled floor tiled with ceramic, natural stone or other tiles, blocks or slabs can be removed totally, or in part, and could be substituted by a non-skid material to give the tiled floor non-skid properties.

Alternatively, non-slip material may be used in place of conventional grout when initially laying a tiled floor, eg a domestic or commercial floor such as a kitchen or bathroom floor, with the non-slip material being flush with or slightly proud of the surrounding tile surfaces to present a non-slip surface. This is in contrast to conventional techniques, where grout is generally recessed below the level of the tile surfaces. Further, the non-slip material used in the invention is considerably more robust and harder wearing than conventional grout, which would wear away rapidly and be ineffective in providing a non-slip effect.

The depressions are preferably grooves or holes which may be cut by mechanical means such as drilling, sawing, milling, or by use of flails, abrasive wheels, diamond-tipped blades, chisels, core drills, drill bits, milling cutters or bush hammers.

The floor or ground surface to be treated may be concrete, stone, steel, tiles, asphalt, tarmac or wood.

The invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a floor treated by the inventive method to render it non-slip;

Figure 2 is a sectional view, on an enlarged scale, through a filled groove in the floor;

Figure 3 shows a modification of Figure 2;
Figure 4 shows various profiles of grooves; and
Figure 5 shows possible patterns of non-slip material in surfaces.

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Detailed description of the drawings

Referring to Figure 1, the concrete floor 10 of a farm building such as a milking parlour is formed with a matrix of grooves 12 by a cutting machine (not shown) which has rotating flails to cut the pattern of grooves 12 shown. Typical groove dimensions are 3mm deep and 6mm wide, with spacing between the centres of adjacent grooves being about 45mm. The grooves 12 are filled with a settleable synthetic plastics material 14 (Figure 2) which is applied to the grooves by hand or pump using a trowel or squeegee device. The plastics material is left flush with the surrounding, ungrooved surface of the floor 10. A non slip coating (eg silica sand) can be applied to the surface of the plastics material. Any surplus additive coating is then brushed off the untreated areas after the plastics material has cured. Alternatively, the plastics material may already contain a non-skid agent.

By using quick setting plastics materials, areas subject to intensive use can be treated with a minimum of disruption. Furthermore, the treated surface is easy to clean and the plastics material seals the grooves against penetration by water and tends to strengthen the floor or ground surface. When applied to tiled floors as a non slip replacement for the grouting, an additional benefit is that it increases hygiene.

In Figure 3 the groove 12 has been filled as to leave the plastics material 14 protruding above the surrounding surface of the floor.

Figure 4 shows various profiles of the grooves 12, and Figure 5 shows various arrays or patterns of the grooves 12, when the treated floor is viewed from above.

CLAIMS

1. A floor or ground surface which has had non-slip characteristics imparted thereto by a material, or a surface coating thereon, which has been applied to and allowed to harden in an array of depressions in the surface.

2. A floor or ground surface according to Claim 1, wherein the depressions comprise grooves or indentations.

3. A floor or ground surface according to Claim 2, wherein the depressions comprise grooves about 6mm wide.

4. A floor or ground surface according to Claim 1, 2 or 3, wherein the array of depressions comprises a regular array of lines and/or circles.

5. A floor or ground surface according to Claim 4, wherein the array comprises a matrix of lines forming a mesh pattern.

6. A floor or ground surface according to Claim 5, wherein the spacing between the centres of adjacent lines is about 45mm.

7. A floor or ground surface according to any one of the preceding claims, wherein the depres-

sions have been formed by cutting, drilling, machining or hammering.

8. A floor or ground surface according to any one of the preceding claims, wherein the material in the depressions comprises a synthetic plastics material or rubber based material.

9. A floor or ground surface according to Claim 8, wherein the material comprises a slurry seal, epoxy resin, rubber (natural or synthetic), synthetic polymer, or a polyurethane, polyethylene, polypropylene or acrylic or nylon based material.

10. A floor or ground surface according to Claim 8 or 9, wherein the plastics material contains or is coated with a non-slip coating aggregate or finish.

11. A floor or ground surface according to any one of the preceding claims, wherein the material in the depressions is flush with the surrounding floor or ground surface.

12. A floor or ground surface according to any one of Claims 1 to 10, wherein the material in the depressions protrudes slightly above the surrounding floor or ground surface.

13. A floor or ground surface according to any one of the preceding claims, wherein the surface which has been treated comprises concrete, stone, steel, tiles, asphalt, tarmac or wood.

14. A floor or ground surface according to any one of the preceding claims, wherein the surface which has been treated comprises a domestic, commercial, agricultural or industrial floor.

15. A floor or ground surface which has had non-slip characteristics imparted thereto by a material, or a surface coating thereon, which has been applied to and allowed to harden in an array of depressions formed in an initially generally planar region of the surface, the hardened material presenting a surface which is less slippery than the original surface material.

16. A method of imparting non-slip characteristics to a floor or ground surface, comprising filling an array of depressions in the surface with a material which hardens to give, or to support, a non-slip surface.

17. A method according to Claim 16, wherein the depressions are formed as grooves or indentations.

18. A method according to Claim 17, wherein the depressions are formed as grooves about 6mm wide.

19. A method according to Claim 16, 17 or 18, wherein the array of depressions are formed in a regular array of lines and/or circles.

20. A method according to Claim 19, wherein the array is formed as a matrix of lines forming a mesh pattern.

21. A method according to Claim 20, wherein the lines are formed with a spacing of about 45mm between the centres of adjacent lines.

22. A method according to any one of Claims 16 to 21, wherein the depressions are formed by cutting, drilling, machining, or hammering.

23. A method according to Claim 16, wherein the surface comprises an initially tiled floor from which the grouting is removed to form the depres-

sions.

24. A method according to any one of Claims 16 to 23, wherein the depressions are filled with material which comprises a synthetic plastics material or rubber based material.

25. A method according to Claim 24, wherein the material comprises a slurry seal, epoxy resin rubber (natural or synthetic), synthetic polymer or a polyurethane, polyethylene, polypropylene or acrylic or nylon based material.

26. A method according to Claim 24 or 25, wherein the plastics material contains or is coated with a non-slip coating aggregate or finish.

27. A method according to any one of Claims 16 to 26, wherein the material is applied to the depressions to be flush with the surrounding floor or ground surface.

28. A method according to any one of Claims 16 to 26, wherein the material is applied to the depressions to protrude slightly above the surrounding floor or ground surface.

29. A method according to any one of Claims 16 to 28, wherein the surface being treated comprises concrete, stone, steel, tiles, asphalt, tarmac or wood.

30. A method according to any one of Claims 16 to 29, wherein the surface being treated comprises a domestic, commercial, agricultural or industrial floor.

31. A method according to any one of Claims 16 to 30, wherein the material is applied to the depressions by hand or pump using a trowel or squeegee device.

32. A method of imparting non-slip characteristics to an existing floor or ground surface, comprising forming a regular array of depressions in a generally planar region of the surface, and filling the depressions with the material which hardens to give, or to support, a surface which is less slippery than the surrounding surface material.

33. A floor or ground surface substantially as herein described with reference to, and as shown in, the accompanying drawings.

34. A method of imparting non-slip characteristics to an existing floor or ground surface, substantially as herein described with reference to the accompanying drawings.

Amendments to the claims have been filed, and have the following effect:-

(a) Claims 1 & 16 above have been deleted or textually amended.

(b) New or textually amended claims have been filed as follows:-

1. A floor or ground surface which has had non-slip characteristics imparted thereto by a material, or a surface coating thereon, which has been applied to and allowed to harden in an array of depressions formed in the surface.

16. A method of imparting non-slip characteristics to a floor or ground surface, comprising forming an array of depressions in the surface and filling the depressions with a material which hardens to give, or to support, a non-slip surface.

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